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CXA20 SERIES

Jameco Part Number 219109

Single and dual output

- 4:1 input voltage range
- No minimum load required
- 6A on 3.3V (48V) output at 50˚C in still air
- Wide operating temperature with overtemperature protection
- ±10% output voltage trim
- Overvoltage protection
- Remote ON/OFF control
- Approved to EN60950, UL1950, cUL1950
- Complies with ETS 300 019-1-3/2-3
- Complies with ETS 300 132-2 input voltage and current requirements
- Complies with ETS 300 386-1
- Pin compatible with NFC15 and NFC20 series
- Fixed switching frequency
- Basic insulation system (input to output)

The CXA20 is a new 20W addition to the CXA family of open-frame, isolated, DC/DC converters. The five model series features a 4:1 input voltage range of 18 to 75VDC, making it suitable for a wide variety of communications and distributed power applications. With its 2.0 x 1.6 inch industry standard footprint, the CXA20 provides an easy upgrade option for new and existing Artesyn customers seeking a high-performance, cost-effective power supply.

The CXA20 is available in output voltages of 3.3V, 5V, 12V, ±5V and ±12V. The 3.3V version delivering up to 6A is fully rated to 20W. Typical efficiency for the CXA20 is 83 percent.

Designed using Artesyn's custom control chip, automated component placement and planar magnetics, the CXA20 affords enhanced performance and reliability through low component count and conservative component deratings.

The CXA20 offers remote on/off, as well as overvoltage, overtemperature and short circuit protection features.

With full international safety approval including EN60950 and cUL1950, the CXA20 reduces system compliance costs and time to market. It provides basic insulation from input to output and can operate in high ambient temperatures with or without airflow.

[2 YEAR WARRANTY]

ARTESYN® TECHNOLOGIES

Stresses in excess of the maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the specification. Exposure to absolute maximum ratings can adversely affect device reliability.

Absolute Maximum Ratings

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - continuous	Vin (cont)	-0.3		80	VDC	Vin(+) - Vin(-)
Input voltage - peak/surge or standard/level	Vin (peak)	-0.3		100	VDC	2s max. non repetitive
Input voltage remote pin	Vrem (peak)	-0.3		75	VDC	Peaks of any duration
Operating temp. - singles	Top	-40		+105	˚C	Measured at thermal reference point, see Note 1 and Fig. 8.1
Operating temp. - duals	Top	-40		+105	˚C	Measured at thermal reference point, see Note 1 and Fig. 8.2
Storage temperature	Tstorage	-55		+125	˚C	

All specifications are at nominal input, full resistive load and 25˚C unless otherwise stated.

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - operating	Vin (oper)	18	-	75	VDC	
Input current - no load	Iin		18	22	mADC	Vin (min) - Vin (max), enabled
Input current - Quiescent	Iin (off)		5	10	mADC	Converter disabled
Input voltage rise/fall time	dv/dt			5	V/ms	As per ETS300-132
Inrush current (i^2t or peak)	Iinrush			-	A^2s	As per ETS300-132
Input ripple rejection			60	-	dB	Frequency <1 kHz
Input fuse				2	A	Slow blow/anti-surge, HRC recommended, 200 V rated

Turn On/Off

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input voltage - turn on	Vin (on)	-	16.5	18	VDC	
Input voltage - turn off	Vin (off)	14	15.5	18	VDC	
Hysteresis			1		VDC	
Turn on delay - enabled, then power applied	Tdelay (power)	-	10	20	msec	With the enable signal asserted, this is the time from when the input voltage reaches the minimum specified operating voltage until the output voltage is within the total regulation band
Turn on delay - power applied, then enabled	Tdelay (enable)	-	10	20	msec	Vin = Vin (nom), then enabled. This is the time taken until the output voltage is within the total error band
Rise time	Trise	-	5	10	msec	From 10% to 90%; full resistive load, no external capacitance

Signal Electrical Interface

Characteristic - Signal Name	Symbol	Min	Typ	Max	Units	Notes and Conditions
At remote/control ON/OFF pin						**See Notes 2 and 3**
Control pin open circuit voltage	Vih (oc)	3	5	6	V	Iih = 0µA; open circuit voltage
High level input voltage	Vih	2			V	Converter guaranteed on when control pin is greater than Vih (min)
High level input current	Iih			100	µA	Current flowing into control pin when pin is pulled high
Acceptable high level leakage current	Iih (leakage)			-50	µA	Acceptable leakage current from signal pin into the open collector driver (neg = from converter)
Low level input voltage	Vil			1.2	V	Converter guaranteed off when control pin is less than Vil (max)
Low level input current	Iil			-150	µA	Vil = 0.4 V
Low level input current	Iil (max)			-200	µA	Vil = 0.0 V; maximum source current from converter with short circuit

Common Protection/Control

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overtemperature shutdown threshold (singles)	Tots	115	120	125	˚C	PCB temperature at PTC(s), non-latching shutdown protection
Overtemperature shutdown - restart hysteresis	-	-	1	-	˚C	
Remote sense compensation			NA		mV	There is no remote compensation available on this device

Reliability and Service Life

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Mean time between failure	MTBF	400,000			Hours	MIL-HDBK-217F, Vin = Vin (nom); Iout = Iout (max); ambient 25˚C; ground benign environment
Mean time between failure	MTBF	TBD			Hours	Demonstrated

Isolation

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input to output test voltage				1500	VDC	Test duration 1s
Input to output capacitance			1500		pF	
Input to output resistance		100			MΩ	Measured with 500 VDC
Input to output insulation system			Basic			

Other Specifications

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Switching frequency	Fsw	360	400	440	kHz	Fixed frequency
Weight	-		26	-	g	

Environmental Requirements

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Thermal performance		-40	+60		˚C	Dependent on input voltage See Notes 1, 5 and Figures 1.1-1.5 and 8
Altitude				3,000	m	Derate max. output
				9,864	ft	current by 20%
				10,000	m	Derate max. output
				32,821	ft	current by 50%

Characteristic	Parameter	Reference	Test Level	Notes and Conditions
Air temperature	Low	IEC 68-2-1	-40˚C	All characteristics and parameters
	High	IEC 68-2-2	+60˚C (T3.4)	extracted from ETS 300 019
	Change	IEC 68-2-14	-40˚C to +60˚C	classes 3.1, 3.2, 3.3 and 3.5
Relative humidity	Low	-	10%	
	High	IEC 68-2-56	93%	Damp heat, 4 days
	Condensation	IEC 68-2-30	90 to 100%	Damp heat, 2 cycles, 25 to 35˚C
Vibration IEC class 3M5	Freq. velocity	IEC 68-2-6	5-9Hz 5mm/s	
	Freq. acceleration	IEC 68-2-6	9-200Hz 1g	
		MIL-STD-202F	Method 204 cond. A	
Shocks IEC class 3M5	Acceleration	IEC 68-2-29	10g	
		MIL-STD-202F	Method 213B cond. F	

Referenced ETSI standards:

ETS 300 019: Environmental conditions and environmental tests for telecommunications equipment
ETS 300 019: Part 1-3 (1997) Classification of environmental conditions stationary use at weather protected locations
ETS 300 019: Part 2-3 (1997) Specification of environmental tests stationary use at weather protected locations

EMC
Electromagnetic Compatibility

Phenomenon	Port	Standard	Test level	Criteria	Notes and conditions
Immunity:					
ESD	Enclosure	EN61000-4-2	6kV cont	NP	As per ETS 300 386-1 table 5
			8kV air	NP	
			8kV cont	RP	
			15kV air	RP	
EFT	DC power	EN61000-4-4	2kV	NP	As per ETS 300 386-1 table 5
			4kV	LFS	
	Signal	EN61000-4-4	1kV	NP	As per ETS 300 386-1 table 5
			2kV	LFS	
Radiated field	Enclosure	EN61000-4-3	10V/m	NP	As per ETS 300 386-1 table 5
Surges	Indoor signal	EN61000-4-5	500V	RP	As per ETS 300 386-1 table 5
Conducted	DC power	EN61000-4-6	10V	NP	As per ETS 300 386-1 table 5
	Signal	EN61000-4-6	10V	NP	
Input transients	DC power				ETS 300 132, ETR 283

EMC
Electromagnetic Compatibility

Phenomenon	Port	Standard	Test level	Criteria	Notes and conditions
Emission:					
Conducted	DC power	EN55022	Level A		See recommended external filter (See Application Note 107) for compliance. Bandwidth 20 kHz to 30 MHz, as per ETS 300 386-1
		EN55022	Level B		See recommended external filter (See Application Note 107) for compliance. Bandwidth 20 kHz to 30 MHz, as per ETS 300 386-1
	Signal	EN55022	Level B		Bandwidth 150kHz to 30MHz, as per ETS 300 386-1
Radiated (See Application Note 107)		EN55022	Level B		Bandwidth 30 MHz to 1 GHz, as per ETS 300 386-1, with Cu ground plane

Performance criteria:
NP: Normal Performance: EUT shall withstand applied test and operate within relevant limits as specified without damage.
RP: Reduced Performance: EUT shall withstand applied test. Reduced performance is permitted within specified limits, resumption to normal performance shall occur at the cessation of the test.
LFS: Loss of Function (self recovery): EUT shall withstand applied test without damage, temporary loss of function permitted during test. Unit will self recover to normal performance after test.

Referenced ETSI standards:
ETS 300 386-1 table 5 (1997): Public telecommunication network equipment, EMC requirements
ETS 300 132-2 (1996): Power supply interface at the input to telecommunication equipment: Part 2 operated by direct current (DC)
ETR 283 (1997): Transient voltages at interface A on telecommunications direct current (DC) power distributions

Safety Agency Approvals

Characteristic	
UL/cUL 1950 File Number	E136005
VDE Reference Number	10401-3336-0154/31HJK DE1-8142 (CB Certificate Number)
VDE License Number	TBA

Standards Compliance List

Standard	Category
EN60950	
UL/cUL1950	3rd edition
VDE	EN60950 (VDE0805) : 1997 + A11

Material Ratings

Characteristic - Signal Name	Notes and Conditions
Flammability rating	UL94V-0
Material type	FR4 PCB

Model Numbers

Model Number	Input Voltage	Output Voltage	Overvoltage Protection (6)	Output Current (Max.)	Typical Efficiency
CXA20-48S3V3	18-75 VDC	3.3V	3.7V	6A	80%
CXA20-48S05	18-75 VDC	5V	6.67V	4A	83%
CXA20-48S12	18-75 VDC	12V	14.25V	1.66A	83%
CXA20-48D05	18-75 VDC	±5V	6.67V	2A ea.	84%
CXA20-48D12	18-75 VDC	±12V	14.25V	0.83A ea.	84%

CXA20-48S3V3 Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	Iin		0.52	0.53	ADC	Vin = Vin (nom); Iout = Iout (max); Vo = Vo (nom)
Input current - maximum	Iin (max)		1.41	1.45	ADC	Vin = Vin (min); Iout = Iout (max); Vo = nom
Reflected ripple current	Iin (ripple)		3	10	mA RMS	Iout = Iout (max), measured with no external bypass capacitor
Reflected ripple current	Iin (ripple)		20	40	mA pk-pk	Iout = Iout (max), measured with no external bypass capacitor
Input capacitance - internal filter (all models)	Cinput		1.5		µF	Internal to converter (ceramic)

CXA20-48S3V3 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vout (nom)	3.25	3.30	3.35	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25°C
Total regulation band	Vout	3.16	-	3.43	VDC	For all line, static load and temperature until end of life.
Line regulation		-	0.10	0.20	%	Iout = Iout (nom) Vin (min) - Vin (max)
Load regulation		-	0.20	0.30	%	Vin = Vin (Nom) Iout (min) - Iout (max)
Temperature regulation				0.02	±%/°C	Vin = Vin (Nom) Iout = Iout (nom)
Output current continuous	Iout	0.00		6.00	ADC	
Output current - short circuit	Isc		5.00	6.00	A RMS	Continuous, unit auto recovers from short, load resistance <20 mΩ
Output voltage - noise	Vp-p Vrms		50 13	75 20	mV pk-pk mV RMS	Measurement bandwidth 20 MHz Measurement bandwidth 20 MHz See Application Note 107 for measurement set-up details

CXA20-48S3V3 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	Vdynamic		1.0	2.0	%	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec
Load transient response - recovery	Trecovery		100	300	µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	Cext	0		10,000 2,000	µF µF	Vin = 18 to 36 VDC Vin = 36 to 75 VDC

CXA20-48S3V3 Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overvoltage clamp voltage	Vov	3.70		4.10	VDC	Non-latching. Refer to Application Note 107
Overcurrent limit inception	Ioc	-	8	9	ADC	Vout = 90% of Vout (nom)
Output voltage trim range		10.0 10.0	11.0 11.0	15.0 15.0	% %	Trim up Trim down
Open sense voltage		NA	NA	NA	VDC	No sense pins on this device

CXA20-48S3V3 Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	79.0	80.0		%	Iout = 100% Iout (max), Vin = 48 VDC
Efficiency	η	78.0	79.0		%	Iout = 50% Iout (max), Vin = 48 VDC

CXA20-48S05 Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	Iin		0.50	0.51	ADC	Vin = Vin (nom); Iout = Iout (max); Vo = Vo (nom)
Input current - maximum	Iin (max)		1.31	1.40	ADC	Vin = Vin (min); Iout = Iout (max); Vo = nom
Reflected ripple current	Iin (ripple)		3	10	mA RMS	Iout = Iout (max), measured with no external bypass capacitor
Reflected ripple current	Iin (ripple)		20	40	mA pk-pk	Iout = Iout (max), measured with no external bypass capacitor
Input capacitance - internal filter (all models)	Cinput		1.5		µF	Internal to converter (ceramic)

CXA20-48S05 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vout (nom)	4.925	5.00	5.075	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25°C
Total regulation band	Vout	4.80	-	5.20	VDC	For all line, static load and temperature until end of life
Line regulation		-	0.10	0.20	%	Iout = Iout (nom) Vin (min) - Vin (max)
Load regulation		-	0.10	0.20	%	Vin = Vin (Nom) Iout (min) - Iout (max)
Temperature regulation		-	-	0.02	±%/°C	Vin = Vin (nom), Iout = Iout (nom)
Output current continuous	Iout	0		4.00	ADC	
Output current - short circuit	Isc		3.30	5.00	A RMS	Continuous, unit auto recovers from short, load resistance <20 mΩ
Output voltage - noise	Vp-p		60	75	mV pk-pk	Measurement bandwidth 20 MHz
	Vrms		9.5	20	mV RMS	Measurement bandwidth 20 MHz See Application Note 107 for measurement set-up details

CXA20-48S05 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	Vdynamic		0.5	2.0	%	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec
Load transient response - recovery	Trecovery		100	300	µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	Cext	0		10,000 2,000	µF µF	Vin = 18 to 36 VDC Vin = 36 to 75 VDC

CXA20-48S05 Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overvoltage clamp voltage	Vov	6.67		7.67	VDC	Non-latching Refer to Application Note 107
Overcurrent limit inception	Ioc	-	6.1	6.50	ADC	Vout = 90% of Vout (nom)
Output voltage trim range		10.0 10.0	11 11	13.0 13.0	% %	Trim up Trim down
Open sense voltage		NA	NA	NA	VDC	No sense pins on this device

CXA20-48S05 Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	82.0	83.0		%	Iout = 100% Iout (max), Vin = 48 VDC
Efficiency	η	81.0	82.0		%	Iout = 50% Iout (max), Vin = 48 VDC

CXA20-48S12 Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	Iin		0.50	0.52	ADC	Vin = Vin (nom); Iout = Iout (max); Vo = Vo (nom)
Input current - maximum	Iin (max)		1.30	1.40	ADC	Vin = Vin (min); Iout = Iout (max); Vo = nom
Reflected ripple current	Iin (ripple)		3	10	mA RMS	Iout = Iout (max), measured with no external bypass capacitor
Reflected ripple current	Iin (ripple)		20	40	mA pk-pk	Iout = Iout (max), measured with no external bypass capacitor
Input capacitance - internal filter (all models)	Cinput		1.5		µF	Internal to converter (ceramic)

CXA20-48S12 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vout (nom.)	11.82	12.0	12.18	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25°C
Total regulation band	Vout	11.52	-	12.48	VDC	For all line, static load and temperature until end of life
Line regulation		-	0.10	0.20	%	Iout = Iout (nom) Vin (min) - Vin (max)
Load regulation		-	0.10	0.20	%	Vin = Vin (Nom) Iout (min) - Iout (max)
Temperature regulation		-	-	0.02	±%/°C	Vin = Vin (nom), Iout = Iout (nom)
Output current continuous	Iout	0.00		1.66	ADC	
Output current - short circuit	Isc		2.00	2.50	A RMS	Continuous, unit auto recovers from short, load resistance <20 mΩ
Output voltage - noise	Vp-p Vrms		60 11	100 20	mV pk-pk mV RMS	Measurement bandwidth 20 MHz Measurement bandwidth 20 MHz See Application Note 107 for measurement set-up details

CXA20-48S12 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Load transient response - peak deviation	Vdynamic		0.5	2.0	%	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec
Load transient response - recovery	Trecovery		100	300	µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	Cext	0		1,000 220	µF µF	Vin = 18 to 36 VDC Vin = 36 to 75 VDC

CXA20-48S12 Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overvoltage clamp voltage	Vov	14.25		15.75	VDC	Non-latching Refer to Application Note 107
Overcurrent limit inception	Ioc		2.7	3.20	ADC	Vout = 90% of Vout (nom)
Output voltage trim range		10	11	13	%	Cannot trim up for Vin <20 V
		10	11	13	%	Trim down
Open sense voltage		NA	NA	NA	VDC	No sense pins on this device

CXA20-48S12 Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	81.0	83.0		%	Iout = 100% Iout (max), Vin = 48 VDC
Efficiency	η	79.0	81.0		%	Iout = 50% Iout (max), Vin = 48 VDC

CXA20-48D05 Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	Iin		0.50	0.51	ADC	Vin = Vin (nom); Iout = Iout (max); Vo = Vo (nom)
Input current - maximum	Iin (max)		1.30	1.40	ADC	Vin = Vin (min); Iout = Iout (max); Vo = nom
Reflected ripple current	Iin (ripple)		3	10	mA RMS	Iout = Iout (max), measured with no external bypass capacitor
Reflected ripple current	Iin (ripple)		20	40	mA pk-pk	Iout = Iout (max), measured with no external bypass capacitor
Input capacitance - internal filter (all models)	Cinput		1.5		µF	Internal to converter (ceramic)

CXA20-48D05 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vout (1)	4.925	5.00	5.075	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25˚C
	Vout (2)	4.925	5.00	5.075	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25˚C
Total regulation band	Vout (1)	4.80	-	5.20	VDC	For all line, static load and temperature until end of life. Does not include cross regulation
	Vout (2)	4.75	-	5.25	VDC	
Line regulation	Vout (1)	-	0.10	0.20	%	Iout = Iout (nom); Vin (min) - Vin (max); positive output
	Vout (2)	-	0.10	0.50	%	Iout = Iout (nom); Vin (min) - Vin (max); negative output
Load regulation	Vout (1)	-	0.10	0.20	%	Vin = Vin (nom), positive output, Iout (1) = Iout (2) = 0% to 100%
	Vout (2)	-	0.10	0.50	%	Vin = Vin (nom), negative output, Iout (1) = Iout (2) = 10% to 100%
Cross regulation	Vout (1)	-	0.10	0.20	%	Iout (1) = 100%, Iout (2) = 10% to 100% or Iout (2) = 100%, Iout (1) = 10% to 100%
	Vout (2)	-	7.00	10.00	%	Vin = Vin (nom)
Temperature regulation				0.02	±%/˚C	Vin = Vin (nom), Iout = Iout (nom)
Output current continuous	Iout	0		2.00	ADC	Each output (See Note 7)

CXA20-48D05 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Output current - short circuit	Isc			2.50	A RMS	Continuous, unit auto recovers from short load resistance <20 mΩ between Vout1 (+) and Vout2 (-)
Output voltage - noise	Vp-p Vrms		55 9	75 20	mV pk-pk mV RMS	Measurement bandwidth: 20 MHz Measurement bandwidth 20 MHz See Application Note 107 for measurement set-up details
Load transient response - peak deviation	Vdynamic		0.5	2.0	%	Peak deviation for 50% to 75% Step load, di/dt = 100 mA/µsec
Load transient response - recovery	Trecovery		100	300	µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	Cext	0		5,000 1,000	µF µF	Vin = 18 to 36 VDC Vin = 36 to 75 VDC

CXA20-48D05 Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overvoltage clamp voltage	Vov	6.67		7.67	VDC	Non-latching, see Note 6 Refer to Application Note 107
Overcurrent limit inception	Ioc		2.9	3.50	ADC	Vout = 90% of Vout (nom), Iout (1) = Iout (2)
Output voltage trim range		10.0 10.0	11 11	13.0 13.0	% %	Trim up Trim down
Open sense voltage		NA	NA	NA	VDC	No sense pins on this device

CXA20-48D05 Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	82	84		%	Iout = 100% Iout (max), Vin = 48 VDC
Efficiency	η	80	82		%	Iout = 50% Iout (max), Vin = 48 VDC

CXA20-48D12 Model

Input Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Input current - operating	Iin		0.50	0.51	ADC	Vin = Vin (nom); Iout = Iout (max); Vo = Vo (nom)
Input current - maximum	Iin (max)		1.32	1.40	ADC	Vin = Vin (min); Iout = Iout (max); Vo = nom
Reflected ripple current	Iin (ripple)		3	10	mA RMS	Iout = Iout (max), measured with no external bypass capacitor
Reflected ripple current	Iin (ripple)		20	40	mA pk-pk	Iout = Iout (max), measured with no external bypass capacitor
Input capacitance - internal filter (all models)	Cinput		1.5		µF	Internal to converter (ceramic)

CXA20-48D12 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Nominal set-point voltage	Vout (1)	11.82	12.0	12.18	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25˚C
	Vout (2)	11.82	12.0	12.18	VDC	Vin = Vin (Nom); Iout = Iout (nom); T = 25˚C
Total regulation band	Vout	11.52	-	12.48	VDC	For all line, static load and temperature until end of life Does not include cross regulation
Line regulation	Vout (1)	-	0.10	0.20	%	Iout = Iout (nom); Vin (min) - Vin (max); positive output
	Vout (2)	-	0.10	0.50	%	Iout = Iout (nom); Vin (min) - Vin (max); negative output
Load regulation	Vout (1)	-	0.10	0.20	%	Vin = Vin (nom), positive output, Iout (1) = Iout (2) = 0% to 100%
	Vout (2)	-	0.10	0.50	%	Vin = Vin (nom), negative output, Iout (1) = Iout (2) = 10% to 100%
Cross regulation	Vout (1)	-	0.10	0.20	%	Iout (1) = 100%, Iout (2) = 10% to 100% or Iout (2) = 100%, Iout (1) = 10% to 100%
	Vout (2)	-	7.00	10.0	%	Vin = Vin (nom)
Temperature regulation				0.02	±%/˚C	Vin = Vin (nom), Iout = Iout (nom)
Output current continuous	Iout	0		0.83	ADC	Each output (See Note 7)

CXA20-48D12 Model

Electrical Characteristics - O/P

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Output current - short circuit	Isc			1.40	A RMS	Continuous, unit auto recovers from short load resistance <20 mΩ between Vout1 (+) and Vout2 (-)
Output voltage - noise	Vp-p Vrms		65 12	100 20	mV pk-pk mV RMS	Measurement bandwidth: 20 MHz Measurement bandwidth 20 MHz See Application Note 107 for measurement set-up details
Load transient response - peak deviation	Vdynamic		0.5	2.0	%	Peak deviation for 50% to 75% step load, di/dt = 100 mA/µsec
Load transient response - recovery	Trecovery		100	300	µsec	Settling time to within 1% of output set point voltage for 50% to 75% step load
External load capacitance	Cext	0		500 100	µF µF	Vin = 18 to 36 VDC Vin = 36 to 75 VDC

CXA20-48D12 Model

Protection and Control Features

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Overvoltage clamp voltage	Vov	14.25		15.75	VDC	Non-latching, see Note 6 See Application Note
Overcurrent limit inception	Ioc		1.4	1.60	ADC	Vout = 90% of Vout (nom), Iout (1) = Iout (2)
Output voltage trim range		10.0	11	13.0	%	Trim up, cannot trim up for Vin <20V
		10.0	11	13.0	%	Trim down
Open sense voltage		NA	NA	NA	VDC	No sense pins on this device

CXA20-48D12 Model

Efficiency

Characteristic	Symbol	Min	Typ	Max	Units	Notes and Conditions
Efficiency	η	82	84		%	Iout = 100% Iout (max), Vin = 48 VDC
Efficiency	η	80	82		%	Iout = 50% Iout (max), Vin = 48 VDC

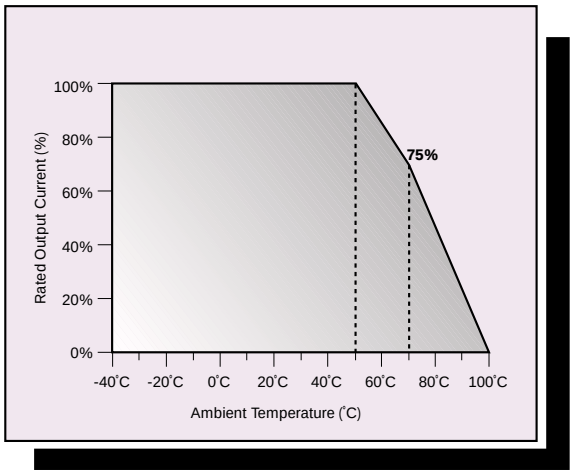


Figure 1.1: Derating Curve Output Current vs Temperature S3V3 Natural Convection (<0.1m/s airflow)

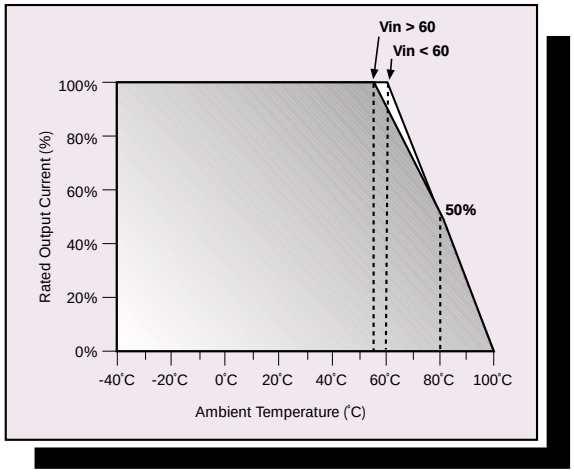


Figure 1.2: Derating Curve Output Current vs Temperature S05 Natural Convection (<0.1m/s airflow)

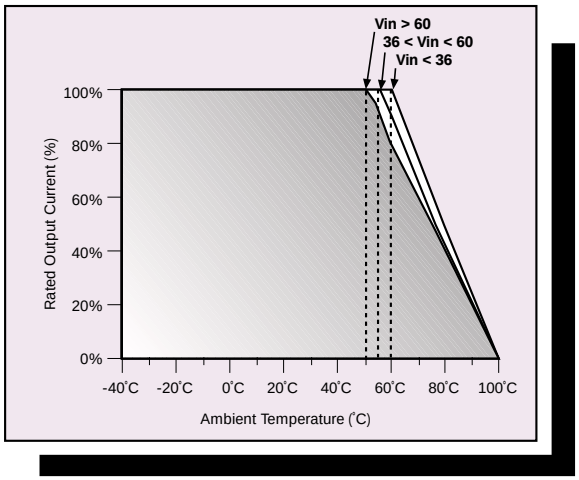


Figure 1.3: Derating Curve Output Current vs Temperature S12 Natural Convection (<0.1m/s airflow)

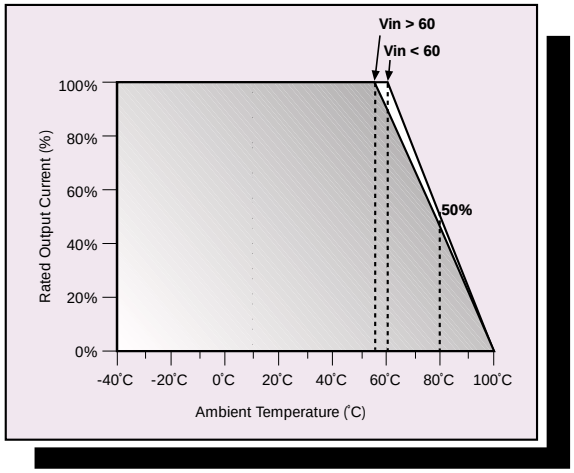


Figure 1.4: Derating Curve Output Current vs Temperature D05 Natural Convection (<0.1m/s airflow)

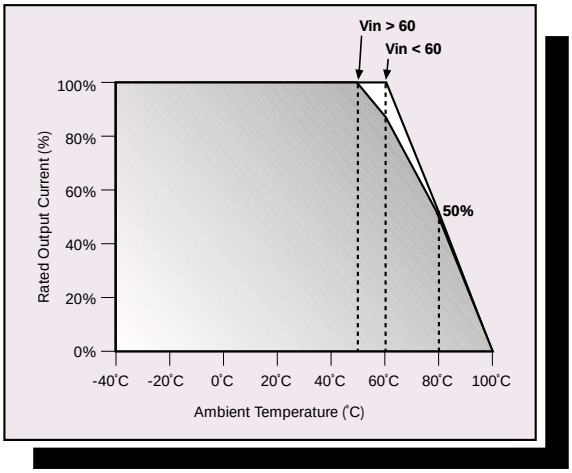


Figure 1.5: Derating Curve Output Current vs Temperature D12 Natural Convection (<0.1m/s airflow)

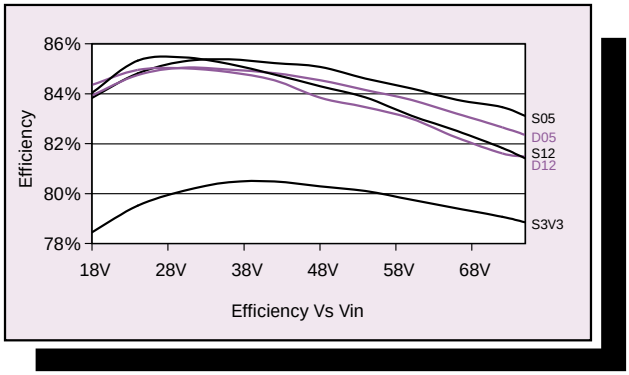


Figure 2: Typical Efficiency vs Vin

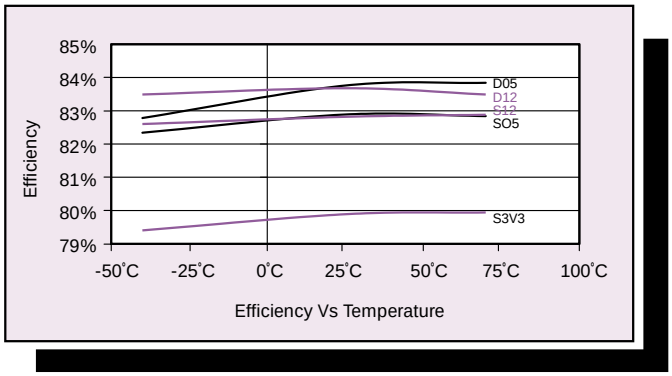


Figure 3: Typical Efficiency vs Ambient Temperature

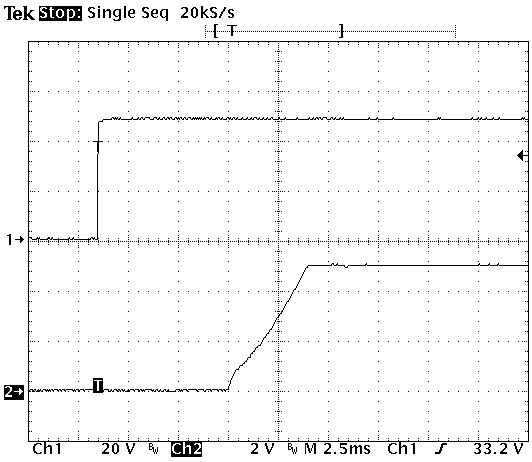


Figure 4: Typical Power-up Characteristic S05
(Ch1 : Input V, Ch2 : Vo), Vin = 48V, Load = 4A, 2000µF

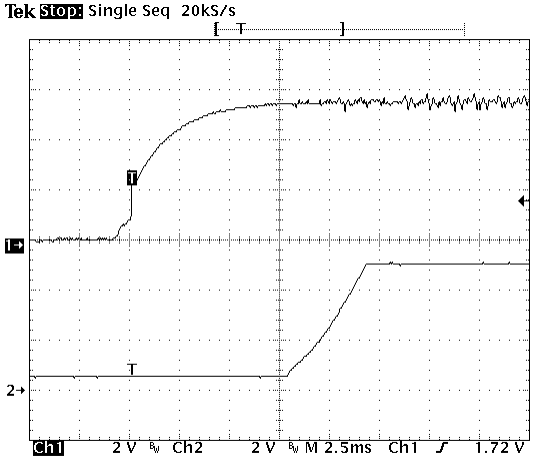


Figure 5: Control On/Off Characteristic S05
(Ch1 : Control, Ch2 : Vo), Vin = 48V, Load = 4A, 2000µF

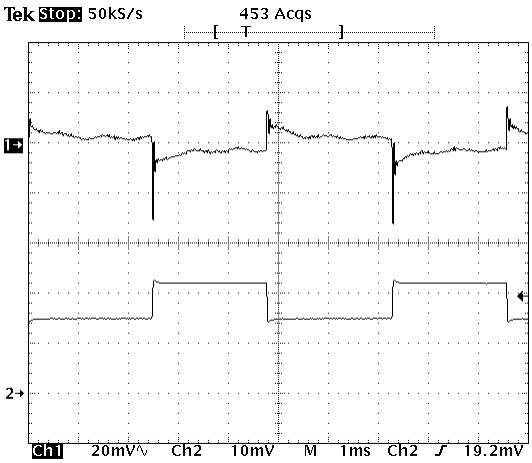


Figure 6.1: Typical Transient Response of S3V3
Ch1 Vo, 20mV$_{AC}$/div. Ch2 Io, 2A/div

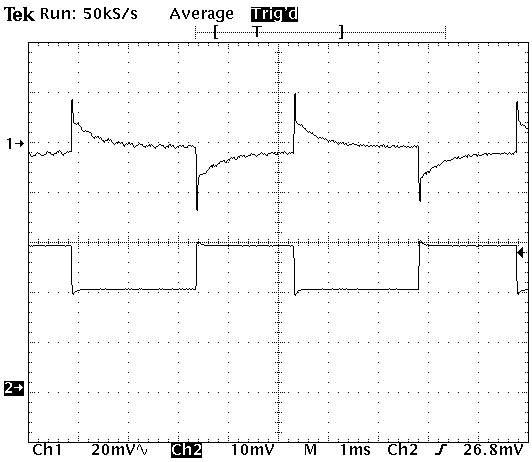


Figure 6.2: Typical Transient Response of S05
Ch1 Vo, 20mV$_{AC}$/div. Ch2 Io, 1A/div

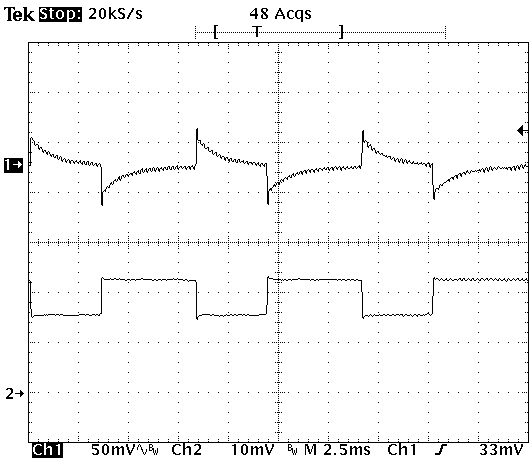


Figure 6.3: Typical Transient Response of S12
Ch1 Vo, 50mV$_{AC}$/div. Ch2 Io, 0.5A/div

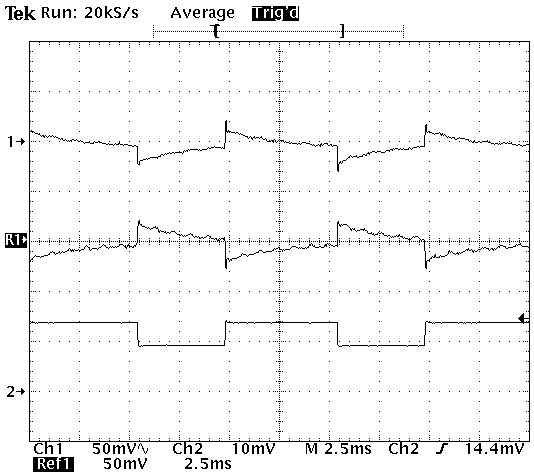


Figure 6.4: Typical Transient Response of D05
Ch1 Vo2, 50mV$_{AC}$/div. R1 Vo1 50mV$_{AC}$/div. Ch2 Io, 1A/div

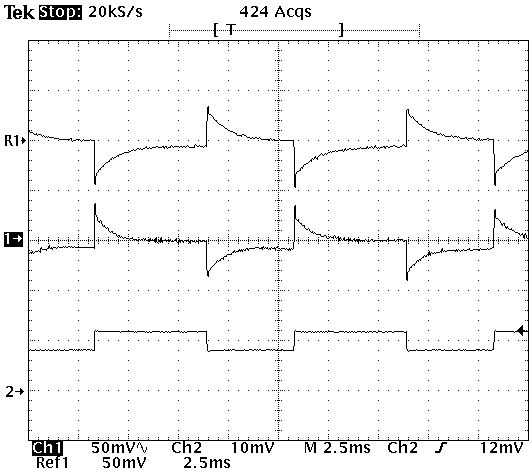


Figure 6.5: Typical Transient Response of D12
Ch1 Vo2, 50mV$_{AC}$/div. R1 Vo1 50mV$_{AC}$/div. Ch2 Io, 0.5A/div

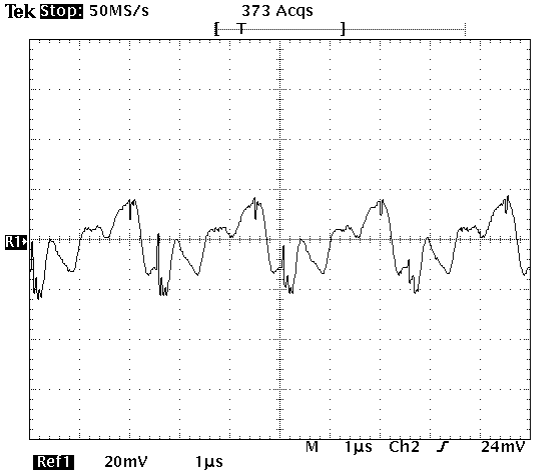


Figure 7.1: Typical Ripple and Noise S3V3 on Test Card at Nominal Conditions

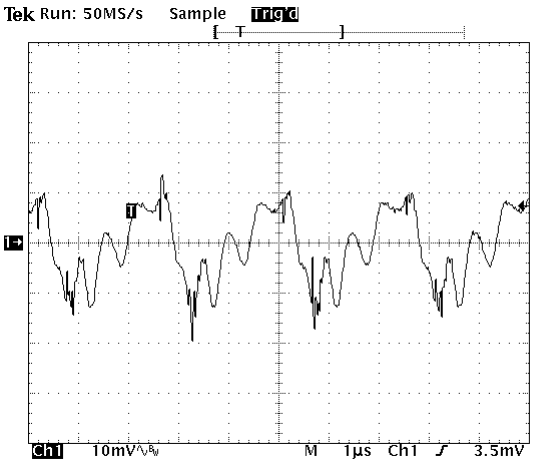


Figure 7.2: Typical Ripple and Noise S05 on Test Card at Nominal Conditions

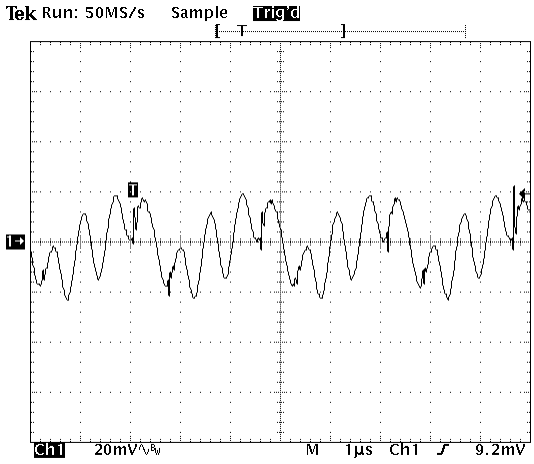


Figure 7.3: Typical Ripple and Noise S12 on Test Card at Nominal Conditions

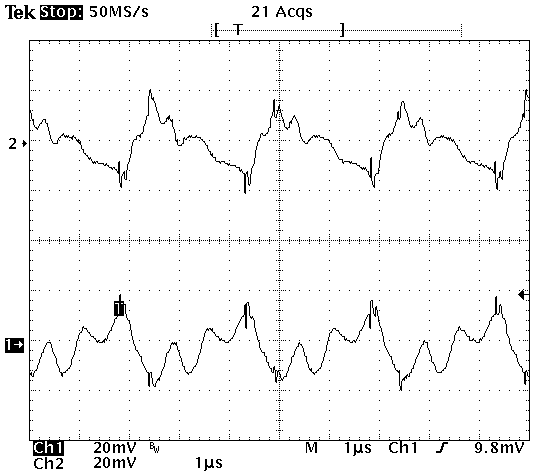


Figure 7.4: Typical Ripple and Noise D05 on Test Card at Nominal Conditions

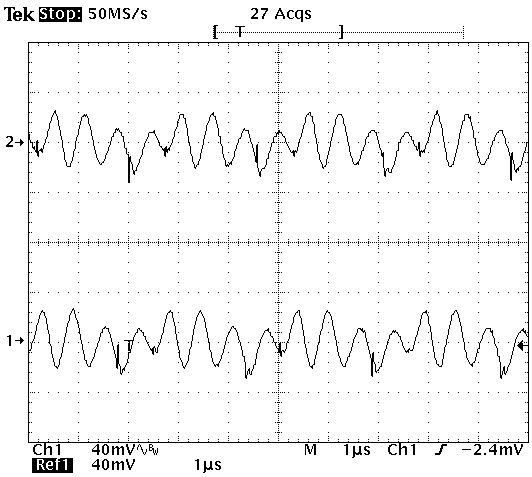


Figure 7.5: Typical Ripple and Noise D12 on Test Card at Nominal Conditions

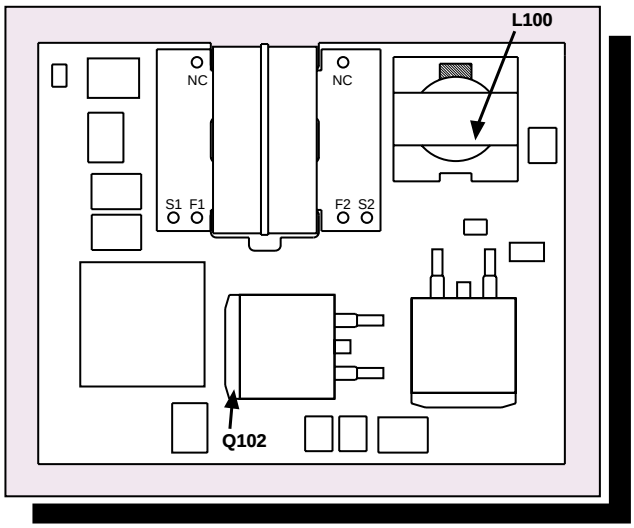


Figure 8.1: Hot Spot Locations on S3V3, S05 and S12 Models

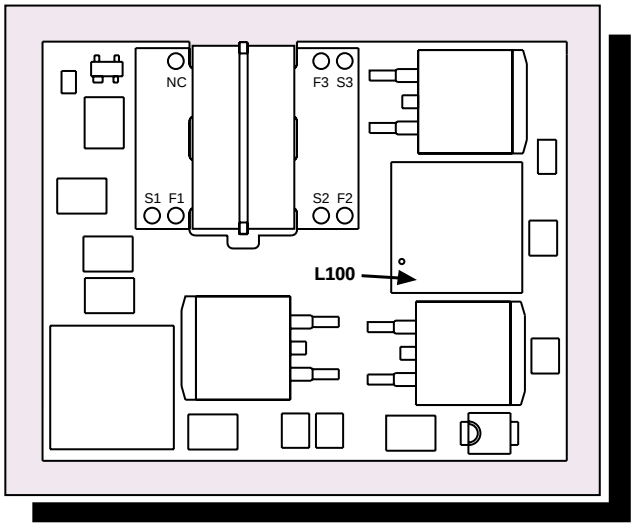
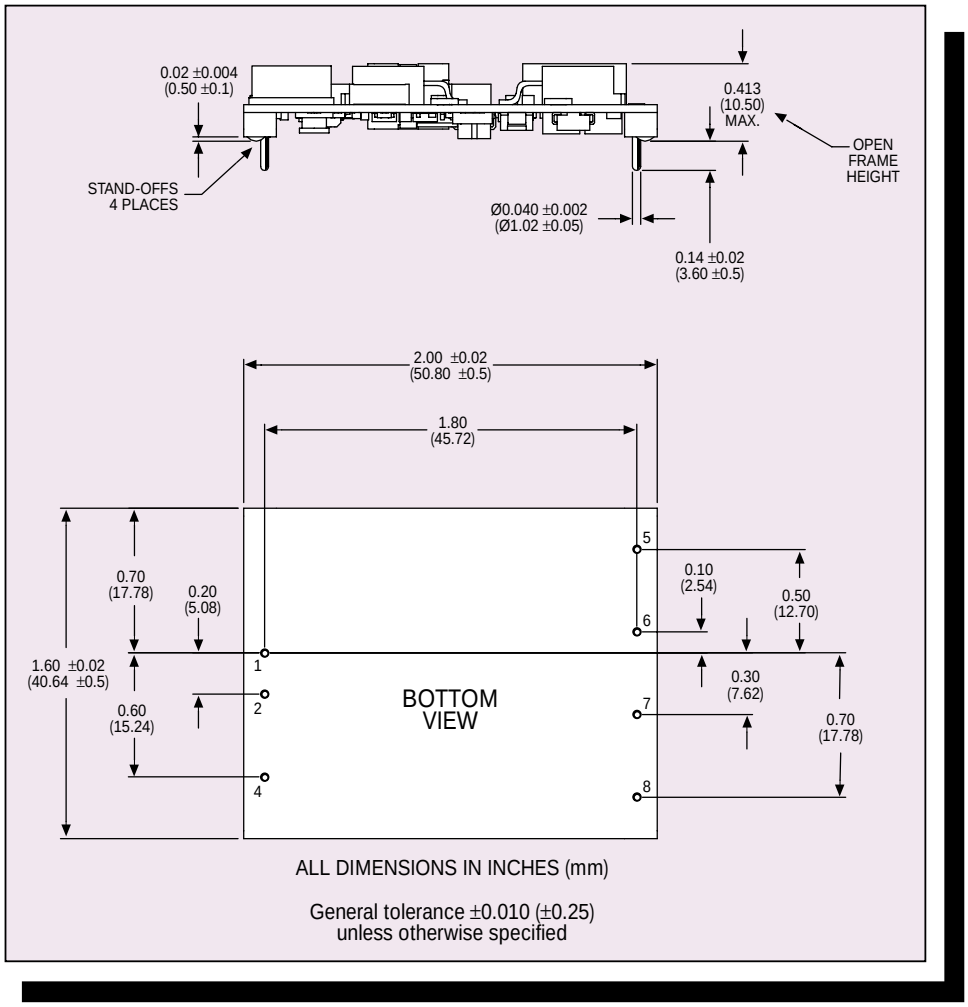


Figure 8.2: Hot Spot Location on D05 and D12 Models



Pin Connections

Pin Number	Single Output	Dual Output
1	Vin+	Vin+
2	Vin-	Vin-
3	No Pin	No Pin
4	Remote On/Off	Remote On/Off
5	No Pin	Vo+
6	Vo+	Common
7	Vo-	Vo-
8	Trim	Trim

Figure 9: Dimensions and Pinout

Note 1

Hot spot temperature is defined as the highest temperature measured at any one of the specified temperature hotspot checkpoints. See Figure 8: Hotspot temperature check points.

Note 2

The control pin is referenced to Vin-.

Note 3

The CXA20 is supplied as standard with active high logic.
Control input pulled low: unit disabled.
Control input floating: unit enabled.
The unit can be supplied with active low logic.

Note 4

Parallel operation of multiple units is not recommended. If parallel operation is required outputs should be decoupled by diodes. Control inputs of multiple units should not be connected but decoupled by diodes or transistors.

Note 5

Thermal reference set up: Unit mounted centrally on a 200mm x 240 mm testboard. Testboard is mounted vertically in a fully enclosed 300mm x 300mm x 300mm testbox. Ambient temperature measured at the bottom of the textbox. Altitude sea level.

Note 6

On the dual output models OVP protection is on positive outputs only. See Application Note for details.

Note 7

For balanced loads. In the case of unbalanced loads a minimum load of 10% is required on each output to maintain cross regulation.

CAUTION: Hazardous internal voltages and high temperatures. Ensure that unit is accessible only to trained personnel. The user must provide the recommended fusing in order to comply with safety approvals.

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